

(51)Int.Cl.	識別記号	F I	テマコード (参考)
H01H 13/02		H01H 13/02	A 5B020
G06F 3/02	310	G06F 3/02	G 5B087
3/033	330	3/033	A 5G006
H01H 9/16		H01H 9/16	C 5G052

審査請求 未請求 請求項の数9 O.L (全7頁)

(21)出願番号 特願2001-30804(P2001-30804)

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(22)出願日 平成13年2月7日(2001.2.7)

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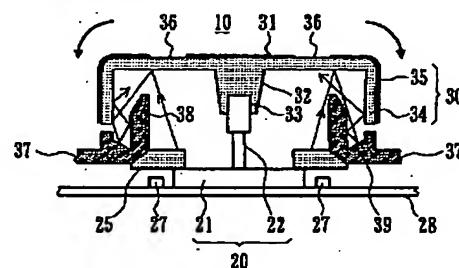
## (54)【発明の名称】操作ノブの照明構造

## (57)【要約】

【課題】カーソルスイッチの操作ノブの前面意匠部の照明光が漏光するのを確実に防止できる、操作ノブの照明構造を安価で提供することを目的とする。

【解決手段】基板に実装されたカーソルスイッチ本体の前面から突出した操作軸と、前面意匠部と、前面意匠部の背面に操作軸に嵌合する孔と、前面意匠部の外周より筒状に形成された筒部とからなる操作ノブと、カーソルスイッチ本体の近傍に実装された発光素子と、発光素子の前方に配設され発光素子の光を前面意匠部へ導く導光部材と、カーソルスイッチと発光素子とが挿通する孔を有し光を前面意匠部の方へ導光する導光筒と、導光筒の基部外周近傍から筒部の下端部近傍へ向けて傾斜する光反射部とからなるパネルとを具備する操作ノブの照明構造において、光反射部は、操作ノブの内面で反射し筒部の下端面近傍に達した光の光道を変え操作ノブの内部へ戻るように形成されていることを特徴とする。

本発明の第1実施の形態に係るカーソルスイッチの操作ノブ照明構造を示す概略構成断面図



## 【特許請求の範囲】

【請求項1】 カーソルスイッチの操作軸と、前面意匠部と、該前面意匠部の外周より前面意匠部の裏面方向に延びる外周部とを有し、カーソルスイッチを揺動可能とする操作ノブと、

前記前面意匠部を内面より照明する照明手段と、前記操作軸を挿通し、前記照明手段の照明を前記前面意匠部に導く導光部と、

前記導光部の外周近傍に、前記操作ノブの内面で反射し前記外周部の端部近傍に達した照明を操作ノブの内面方向に反射させる光反射部とを備えることを特徴とする操作ノブの照明構造。

【請求項2】 前記光反射部は、前記導光部の外周近傍から前記外周部の下端部近傍へ向けて傾斜し、前記操作ノブの内面で反射して前記外周部の下端面近傍に達した照明が該操作ノブの内面方向へ戻るように形成されていることを特徴とする請求項1記載の操作ノブの照明構造。

【請求項3】 前記光反射部は、前記導光部の基部外周近傍から前記外周部の下端部近傍へ向けて傾斜するように設けられていることを特徴とする請求項1記載の操作ノブの照明構造。

【請求項4】 前記光反射部は、前記導光部の外周近傍から前記外周部の下端部近傍へ向けて階段状に形成されていることを特徴とする請求項1記載の操作ノブの照明構造。

【請求項5】 前記光反射部は、前記階段状の段面が傾斜して形成されていることを特徴とする請求項4記載の操作ノブの照明構造。

【請求項6】 カーソルスイッチの操作軸と、前面意匠部と、該前面意匠部の外周より前面意匠部の裏面方向に延びる外周部とを有し、カーソルスイッチを揺動可能とする操作ノブと、

前記前面意匠部を内面より照明する照明手段と、前記操作軸を挿通し、前記照明手段の照明を前記前面意匠部に導く導光部と、

前記操作ノブの外周部の内径に係合する筒部と、該筒部より中心方向へ延在し前記導光部の先端部近傍に達する遮光フィンとからなり、前記操作ノブの内面で反射して該外周部の下端面近傍に達した照明が該操作ノブの内面方向へ戻るように形成された遮光部品とを備えることを特徴とする操作ノブの照明構造。

【請求項7】 前記遮光部品は、非透光性の合成ゴムまたは樹脂部材などにより形成されていることを特徴とする請求項6記載の操作ノブの照明構造。

【請求項8】 カーソルスイッチの操作軸と、前面意匠部と、該前面意匠部の外周より前面意匠部の裏面方向に延びる外周部とを有し、カーソルスイッチを揺動可能とする操作ノブと、

前記前面意匠部を内面より照明する照明手段と、

前記操作軸を挿通し、前記照明手段の照明を前記前面意匠部に導く導光部と、

前記導光部に係合する筒部と、該筒部より外側方向へ延在し前記操作ノブの外周部の内面に弾接し、前記操作ノブの内面で反射して前記外周部の下端面近傍に達した照明が該操作ノブの内面方向へ戻るように形成された遮光フィンとを具備する遮光部品とを備えることを特徴とする操作ノブの照明構造。

【請求項9】 前記遮光部品は、可撓性の高い非透光性の合成ゴムまたは樹脂部材などにより形成されていることを特徴とする請求項8記載の操作ノブの照明構造。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】 本発明は、表示装置に表示されるカーソルを移動させるためのカーソルスイッチの操作軸に嵌合した操作ノブの照明に関し、詳細にはカーソルスイッチの操作時においても操作ノブの照明光が外部に漏れず、また、より明るく均一に照明できる操作ノブの照明構造に関する。

## 【0002】

【従来の技術】 従来のカーソルスイッチの操作ノブの照明構造を図6を用いて説明する。

【0003】 図6は従来のカーソルスイッチの操作ノブの照明構造を示す概略構成断面図である。

【0004】 70は自動車等に搭載される電子機器、例えば、ナビゲーション装置の表示部に表示されるカーソルを移動させるためのカーソルスイッチ71の操作軸73に嵌合した操作ノブの照明構造である。

【0005】 操作ノブの照明構造70は、カーソルスイッチ71、導光部品75、発光素子77、プリント基板78、操作ノブ80およびパネル90などにより構成されている。

【0006】 カーソルスイッチ71は、スイッチ本体72と操作軸73とからなり、操作軸73の傾きの方向（例えば所定の8方向）に傾けることにより、表示部に表示されるカーソルを所定の位置に移動させるスイッチで、プリント基板78に実装して用いられる。また、スイッチ本体72の外周の近傍（例えば所定の4方向）には、操作ノブ80を照明する発光素子77（LED）がプリント基板78に実装されている。

【0007】 導光部品75は、基板78に実装された発光素子77の光を操作ノブ80の背面に導光し、操作ノブ80の前面意匠部82を照明するもので発光素子77の前方部（図示上方）に配設されている。導光部品75の材料にはシリコン系やアクリル系の樹脂部材が用いられ樹脂成形加工により形成される。

【0008】 操作ノブ80は、天板付筒形状をしており、天板部には文字や記号などの意匠81が形成された前面意匠部82と、前面意匠部82の背面中央部にはカーソルスイッチ71の操作軸73に挿入する冠着部83

が突出しており、冠着部83には操作軸73に嵌合する圧入穴84が形成されている。操作ノブ80の骨格部分85には乳白色の透光性樹脂部材などが用いられ、骨格部分85の外周部86には所望する非透光性樹脂部材が用いられており2色成形加工により形成される。そして、背面からの光により前面意匠部82が照明される。また、操作ノブ80は2色成形加工で形成される他に骨格部分85を透光性樹脂部材で樹脂成形加工した後に、骨格部分85の外周部86を所望する非透光性の塗料を用いて塗装し、レーザ加工などにより所定の部分の塗料を除去して前面意匠部82を形成することもできる。その他に、単色成形でノブ全体を照明することもできる。

【0009】パネル90には、導光部品75の外周に当接し操作ノブ80の筒部（例えば円筒）の内周部内の方へ延在する円筒部91が形成されている。パネル90の材料には樹脂部材が用いられ樹脂成形加工により形成される。

#### 【0010】

【発明が解決しようとする課題】しかし、上述の操作ノブの照明構造70では、カーソルスイッチ71の操作時に操作ノブ80の前面意匠部82を照明する光が操作ノブ80の内面で反射し、反射した光が操作ノブ80の下端部とパネル90の隙間から漏れ、漏れた光がパネル90で反射して操作ノブ80の外へ漏光するという問題がある。これらの対策として例えば漏光防止部品（図示省略）を追加することにより対応することができるが、構成部品点数が増えコスト高につながるおそれがある。

【0011】本発明は上述の問題を解決するもので、カーソルスイッチの操作ノブの前面意匠部の照明光が漏光するのを確実に防止できる、操作ノブの照明構造を安価で提供することを目的とする。

#### 【0012】

【課題を解決するための手段】本発明は上述の目的を達成するもので、カーソルスイッチの操作軸と、前面意匠部と、該前面意匠部の外周より前面意匠部の裏面方向に延びる外周部とを有し、カーソルスイッチを揺動可能とする操作ノブと、前記前面意匠部を内面より照明する照明手段と、前記操作軸を挿通し、前記照明手段の照明を前記前面意匠部に導く導光部と、前記導光部の外周近傍に、前記操作ノブの内面で反射し前記外周部の端部近傍に達した照明を操作ノブの内面方向に反射させる光反射部とを備えることを特徴とするものである。

【0013】また、前記光反射部は、前記導光部の外周近傍から前記外周部の下端部近傍へ向けて傾斜し、前記操作ノブの内面で反射して前記外周部の下端面近傍に達した照明が該操作ノブの内面方向へ戻るように形成されていることを特徴とするものである。

【0014】また、前記光反射部は、前記導光部の基部外周近傍から前記外周部の下端部近傍へ向けて傾斜するように設けられていることを特徴とするものである。

【0015】また、前記光反射部は、前記導光部の外周近傍から前記外周部の下端部近傍へ向けて階段状に形成されていることを特徴とするものである。

【0016】また、前記光反射部は、前記階段状の段面が傾斜して形成されていることを特徴とするものである。

【0017】また、カーソルスイッチの操作軸と、前面意匠部と、該前面意匠部の外周より前面意匠部の裏面方向に延びる外周部とを有し、カーソルスイッチを揺動可能とする操作ノブと、前記前面意匠部を内面より照明する照明手段と、前記操作軸を挿通し、前記照明手段の照明を前記前面意匠部に導く導光部と、前記操作ノブの外周部の内径に係合する筒部と、該筒部より中心方向へ延在し前記導光部の先端部近傍に達する遮光フィンとからなり、前記操作ノブの内面で反射して該外周部の下端面近傍に達した照明が該操作ノブの内面方向へ戻るように形成された遮光部品とを備えることを特徴とするものである。

【0018】また、前記遮光部品は、非透光性の合成ゴムまたは樹脂部材などにより形成されていることを特徴とするものである。

【0019】また、カーソルスイッチの操作軸と、前面意匠部と、該前面意匠部の外周より前面意匠部の裏面方向に延びる外周部とを有し、カーソルスイッチを揺動可能とする操作ノブと、前記前面意匠部を内面より照明する照明手段と、前記操作軸を挿通し、前記照明手段の照明を前記前面意匠部に導く導光部と、前記導光部に係合する筒部と、該筒部より外側方向へ延在し前記操作ノブの外周部の内面に弾接し、前記操作ノブの内面で反射して前記外周部の下端面近傍に達した照明が該操作ノブの内面方向へ戻るように形成された遮光フィンとを備えることを特徴とするものである。

【0020】また、前記遮光部品は、可撓性の高い非透光性の合成ゴムまたは樹脂部材などにより形成されていることを特徴とするものである。

#### 【0021】

【発明の実施の形態】本発明の第1の実施の形態を図1を用いて説明する。

【0022】図1は本発明の第1の実施の形態に係るカーソルスイッチの操作ノブの照明構造を示す概略構成断面図である。

【0023】10は自動車等に搭載される電子機器、例えば、ナビゲーション装置の表示部に表示されるカーソルを移動させるためのカーソルスイッチ20の操作軸22に嵌合した操作ノブの照明構造である。

【0024】操作ノブの照明構造10は、カーソルスイッチ20、導光部品25、発光素子27、プリント基板28、操作ノブ30およびパネル37などにより構成されている。

【0025】カーソルスイッチ20は、スイッチ本体21と操作軸22とがなり、操作軸22の傾きの方向(例えば所定の8方向)に傾けることにより、表示部に表示されるカーソルを所定の位置に移動させるスイッチで、プリント基板28に実装して用いられる。また、スイッチ本体21の外周の近傍(例えば所定の4方向)には、操作ノブ30を照明する発光素子27(LEDで発光手段に相当)がプリント基板28に実装されている。

【0026】導光部品25は、基板28に実装された発光素子27の光を拡散させて操作ノブ30の背面に導光し、操作ノブ30の前面意匠部31を照明するもので発光素子27の前方部(図示上方)に配設されている。導光部品25の材料にはシリコン系やアクリル系の樹脂部材が用いられ樹脂成形加工により形成される。

【0027】操作ノブ30は、天板付筒形状をしており、天板部には文字や記号などの意匠36が形成された前面意匠部31と、前面意匠部31の背面中央部にはカーソルスイッチ20の操作軸22に挿入する冠着部32が突出しており、冠着部32には操作軸22に嵌合する圧入穴33が形成されている。操作ノブ30の骨格部分34には乳白色の透光性樹脂部材などが用いられ、骨格部分34の外周面35には所望する非透光性樹脂部材が用いられており2色成形加工により形成される。そして、背面からの光により前面意匠部31が照明される。また、操作ノブ30は2色成形加工で形成される他に骨格部分34を透光性樹脂部材で樹脂成形加工した後に、骨格部分34の外周面35を所望する非透光性の塗料を用いて塗装し、レーザ加工などにより所定の部分の塗料を除去して前面意匠部31を形成することもできる。

【0028】パネル37には、導光部品25の外周に当接し操作ノブ30の筒部(例えば円筒)の内周部の方へ延在する円筒部38(導光部に相当)が形成されている。そして、円筒部38の基部の外周から操作ノブ30の筒部の下方に向けて傾斜した光反射部39が形成されている。光反射部39では操作ノブ30の内面で反射し、操作ノブ30の下端部から外へ漏れようとする光が、光反射部39で反射して再度操作ノブ30の内側へ戻り前面意匠部31の照明光となる。パネル37の材料には樹脂部材が用いられ樹脂成形加工により形成される。

【0029】以上説明したように本発明の第1の実施の形態に係るカーソルスイッチ20の操作ノブの照明構造10によれば、パネル37の円筒部38の基部の外周に光反射部39を形成することにより、操作ノブ30の内面で反射した光が、光反射部39で反射して再度操作ノブ30の内側へ戻るので、カーソルスイッチ20の操作時においても、操作ノブ30の照明光が操作ノブ30の外部に漏れず、操作ノブ30の前面意匠部31をより明るく均一に照明することができる。従って、遮光部品などの構成部品点数を増やすことなく照明品質の向上とコスト低減が図れる。

【0030】次に、本発明の第2の実施の形態を図2を用いて説明する。

【0031】図2は本発明の第2の実施の形態に係るカーソルスイッチの操作ノブの照明構造を示す概略構成断面図である。尚、第2の実施の形態は第1の実施の形態の一部を変更したもので、その他については第1の実施の形態と略同じであるので、同じ構成については同じ符号を付し説明を省略する。

【0032】操作ノブの照明構造11は、カーソルスイッチ20、導光部品25、発光素子27、プリント基板28、操作ノブ30およびパネル40などにより構成されている。

【0033】パネル40には、導光部品25の外周に当接し操作ノブ30の筒部(例えば円筒)の内周部の方へ延在する円筒部41(導光部に相当)が形成されている。そして、円筒部41の外周の略中央部から操作ノブ30の筒部の下方に向けて下る階段状の光反射部42が形成されている。光反射部42では操作ノブ30の内面で反射し、操作ノブ30の下端部から外へ漏れようとする光が、光反射部42で反射して再度操作ノブ30の内側へ戻り前面意匠部31の照明光となる。

【0034】その他に、階段状の光反射部42を操作ノブ30の筒部の下方からパネル40の円筒部41の基部の外周方向に向けて下る階段状に形成(図示省略)してもよい。パネル40の材料には樹脂部材が用いられ樹脂成形加工により形成される。

【0035】以上説明したように本発明の第2の実施の形態に係るカーソルスイッチ20の操作ノブの照明構造

31においても、第1の実施の形態と同じようにパネル40の円筒部41の外周に階段状の光反射部42が設けられているので、操作ノブ30の内面で反射した光が、階段状のそれぞれの光反射部42で反射して、再度操作ノブ30の内側へ戻るので、カーソルスイッチ20の操作時においても、操作ノブ30の照明光が操作ノブ30の外部に漏れず、操作ノブ30の前面意匠部31をより明るく均一に照明することができる。従って、遮光部品などの構成部品点数を増やすことなく照明品質の向上とコスト低減が図れる。

【0036】次に、本発明の第3の実施の形態を図3を用いて説明する。

【0037】図3は本発明の第3の実施の形態に係るカーソルスイッチの操作ノブの照明構造を示す概略構成断面図である。尚、第3の実施の形態は第2の実施の形態の一部を変更したもので、その他については第1および第2の実施の形態と略同じであるので、同じ構成については同じ符号を付し説明を省略する。

【0038】操作ノブの照明構造12は、カーソルスイッチ20、導光部品25、発光素子27、プリント基板28、操作ノブ30およびパネル45などにより構成さ

れている。

【0039】パネル45には、導光部品25の外周に当接し操作ノブ30の筒部（例えば円筒）の内周部の方へ延在する円筒部46（導光部に相当）が形成されている。そして、円筒部46の外周の略中央部から操作ノブ30の筒部の下方に向けて下る階段状の光反射部47が形成されており、光反射部47の上面は円筒部46の中心方向に向けて下るように勾配が設けられている。光反射部47では操作ノブ30の内面で反射し、操作ノブ30の下端部から外へ漏れようとする光が、光反射部47で反射して再度操作ノブ30の内側へ戻り前面意匠部31の照明光となる。

【0040】その他に、階段状の光反射部47を操作ノブ30の筒部の下方からパネル45の円筒部46の基部の外周方向に向けて下る階段状に形成（図示省略）しても、図2に示すものと殆ど変わらない同じ効果を得ることができる。パネル45の材料には樹脂部材が用いられ樹脂成形加工により形成される。

【0041】以上説明したように本発明の第3の実施の形態に係るカーソルスイッチ20の操作ノブの照明構造12においても、第2の実施の形態と同じようにパネル45の円筒部46の外周に階段状で、しかも、円筒の中心部の方へに向けて下がるような勾配を有する光反射部47が設けられているので、操作ノブ30の内面で反射し、操作ノブ30の下端部から外へ漏れようとする光が、階段状のそれぞれの光反射部47で反射して、再度操作ノブ30の内側へ戻るので、カーソルスイッチ20の操作時においても、操作ノブ30の照明光が操作ノブ30の外部に漏れず、操作ノブ30の前面意匠部31をより明るく均一に照明することができる。従って、遮光部品などの構成部品点数を増やすことなく照明品質の向上とコスト低減が図れる。

【0042】次に、本発明の第4の実施の形態を図4を用いて説明する。

【0043】図4は本発明の第4の実施の形態に係るカーソルスイッチの操作ノブの照明構造を示す概略構成断面図である。尚、第4の実施の形態は第1の実施の形態の一部を変更したもので、その他については第1の実施の形態と略同じであるので、同じ構成については同じ符号を付し説明を省略する。

【0044】操作ノブの照明構造13は、カーソルスイッチ20、導光部品25、発光素子27、プリント基板28、操作ノブ30、パネル50および遮光部品55などにより構成されている。

【0045】パネル50には、導光部品25の外周に当接し操作ノブ30の筒部（例えば円筒）の内周部の方へ延在する円筒部51（導光部に相当）が形成されている。パネル50の材料には樹脂部材が用いられ樹脂成形加工により形成される。

【0046】遮光部品55は、操作ノブ30の筒部の内

径に係合する円筒部56と、円筒部56の下端部より円筒部56の中心方向へ突出する遮光フィン57が形成されている。遮光部品55の材料には非透光性（例えば黒色）の合成ゴム部材または樹脂部材などが用いられ成形加工により形成される。

【0047】以上説明したように本発明の第4の実施の形態に係るカーソルスイッチ20の操作ノブの照明構造13によれば、操作ノブ30の内側面に遮光部品55を配設することにより、操作ノブ30の内面で反射し操作ノブ30の下端部から外へ漏れようとする光が、遮光部品55の遮光フィン57とパネル50の円筒部51とで確実に遮光される。従って、カーソルスイッチ20の操作時においても操作ノブ30の照明光が操作ノブ30の外部に漏れず、操作ノブ30をより明るく均一に照明することができる。その他に、構成部品の形状が簡略化されているので金型費が安くなりコスト面でも効果がある。

【0048】尚、本発明の第4の実施の形態に係る遮光部品55を第1、第2および第3の実施の形態と併用することにより、操作ノブ30の前面意匠部31の照明品質をより向上させることができる。

【0049】次に、本発明の第5の実施の形態を図5を用いて説明する。

【0050】図5は本発明の第5の実施の形態に係るカーソルスイッチの操作ノブの照明構造を示す概略構成断面図である。尚、第5の実施の形態は第1の実施の形態の一部を変更したもので、その他については第1の実施の形態と略同じであるので、同じ構成については同じ符号を付し説明を省略する。

【0051】操作ノブの照明構造14は、カーソルスイッチ20、導光部品25、発光素子27、プリント基板28、操作ノブ30、パネル60および遮光部品65などにより構成されている。

【0052】パネル60には、導光部品25の外周に当接し操作ノブ30の筒部（例えば円筒）の内周部の方へ延在する円筒部61（導光部に相当）が形成されている。パネル60の材料には樹脂部材が用いられ樹脂成形加工により形成される。

【0053】遮光部品65は、パネル60の円筒部61の外径に係合する円筒部66と、円筒部66の上端部より操作ノブ30の筒部の内周部の方へ延在する遮光フィン67が形成されている。遮光フィン67の外径は操作ノブ30の筒部の内径よりも大きく（係合時に撓んだ状態で、しかもカーソルスイッチ20の操作時において隙間ができる程度）形成されている。遮光部品65の材料に可撓性の高い非透光性（例えば黒色）の合成ゴム部材または樹脂部材などが用いられ成形加工により形成される。

【0054】以上説明したように本発明の第4の実施の

形態に係るカーソルスイッチ20の操作ノブの照明構造14によれば、パネル60の円筒部61に固定された遮光部品65の遮光フィン67の外周が、操作ノブ30の内側面に撓んだ状態で配設されていて密着状態となり、カーソルスイッチ20の操作時においても、操作ノブ30の内側面と遮光フィン67の外周との間に隙間ができないので、照明光が操作ノブ30の外部に漏れのを完全に防止することができる。従って、操作ノブ30の前面意匠部31をより明るく均一に照明することができる、照明品質の向上が図れる。その他に、構成部品の形状が簡略化されているので金型費が安くなりコスト面でも効果がある。

【0055】尚、本実施の形態では遮光部品65の遮光フィン67の中央部が前面意匠部31の方へ撓んでいるが、その逆の場合でも同じ効果を得ることができる。また、撓まなくてても弾接程度でも条件により効果を得ることができる。

#### 【0056】

【発明の効果】以上説明したように本発明によれば、カーソルスイッチの操作ノブの前面意匠部の照明光が漏光するのを確実に防止できる、操作ノブの照明構造を安価で提供することができる。

#### 【図面の簡単な説明】

【図1】本発明の第1の実施の形態に係るカーソルスイッチの操作ノブの照明構造を示す概略構成断面図である。

【図2】本発明の第2の実施の形態に係るカーソルスイッチの操作ノブの照明構造を示す概略構成断面図である。

【図3】本発明の第3の実施の形態に係るカーソルスイ

ッチの操作ノブの照明構造を示す概略構成断面図である。

【図4】本発明の第4の実施の形態に係るカーソルスイッチの操作ノブの照明構造を示す概略構成断面図である。

【図5】本発明の第5の実施の形態に係るカーソルスイッチの操作ノブの照明構造を示す概略構成断面図である。

【図6】従来のカーソルスイッチの操作ノブの照明構造を示す概略構成断面図である。

#### 【符号の説明】

10, 11, 12, 13, 14···操作ノブの照明構造

20···カーソルスイッチ

21···スイッチ本体

22···操作軸

25···導光部品

27···発光素子

28···プリント基板

30···操作ノブ

20 31···前面意匠部

32···冠着部

33···圧入穴

34···骨格部分

35···外周面

36···意匠

37, 40, 45, 50, 60···パネル

38, 41, 46, 51, 56, 61, 66···円筒部

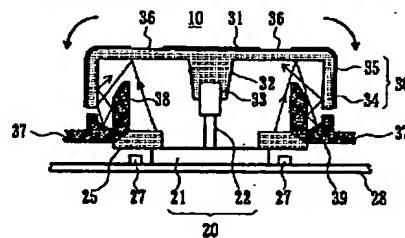
39, 42, 47···光反射部

55, 65···遮光部品

30 57, 67···遮光フィン

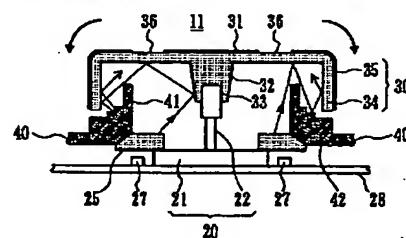
【図1】

本発明の第1実施の形態に係るカーソルスイッチの操作ノブの照明構造を示す概略構成断面図



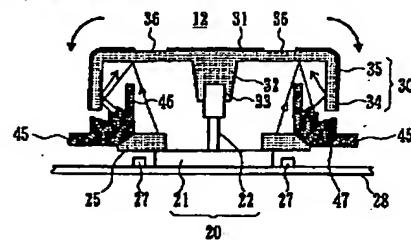
【図2】

本発明の第2実施の形態に係るカーソルスイッチの操作ノブの照明構造を示す概略構成断面図



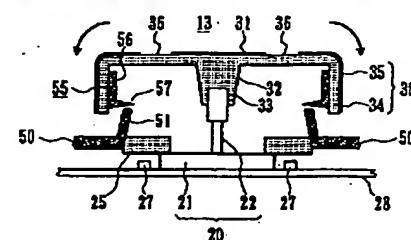
【図3】

本発明の第3実施の形態に係るカーソルスイッチの操作ノブ照明構造を示す概略構成断面図



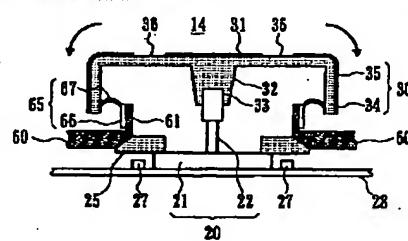
【図4】

本発明の第4実施の形態に係るカーソルスイッチの操作ノブ照明構造を示す概略構成断面図



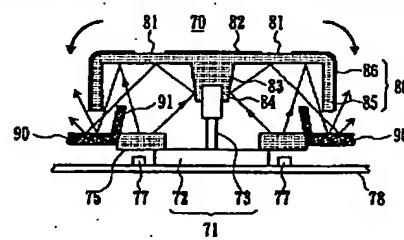
【図5】

本発明の第5実施の形態に係るカーソルスイッチの操作ノブ照明構造を示す概略構成断面図



【図6】

従来のカーソルスイッチの操作ノブ照明構造を示す概略構成断面図



フロントページの続き

Fターム(参考) 5B020 AA17 DD03 DD27  
 5B087 AA09 AB04 BC02 BC19  
 5G006 JB03 JC02 JF23 JF27 LA01  
 5G052 AA21 BB01 HC04 JA02 JA06  
 JB05 JC04 JC10 JC20

Date: January 15, 2004

*Declaration*

*I, Michihiko Matsuba, President of Fukuyama Sangyo Honyaku Center, Ltd., of 16-3, 2-chome, Nogami-cho, Fukuyama, Japan, do solemnly and sincerely declare that I understand well both the Japanese and English languages and that the attached document in English is a full and faithful translation, of the copy of Japanese Unexamined Patent No. 2002-231086 laid open on August 16, 2002.*



*Michihiko Matsuba*

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ILLUMINATION STRUCTURE OF OPERATING KNOB

Japanese Unexamined Patent No. 2002-231086

Laid-open on: August 16, 2002

Application No. 2001-30804

Filed on: February 7, 2001

Inventor: Sei TSUDA, et al.

Applicant: Fujitsu Ten Ltd.

SPECIFICATION

[TITLE OF THE INVENTION] Illumination Structure of Operating Knob

[ABSTRACT]

[Theme] To provide an illumination structure of an operating knob at low cost that can reliably prevent leakage of illumination light at the front decorative part of an operating knob of a cursor switch.

[Solution Means] The illumination structure of an operating knob comprises an operating knob composed of an operating axle that protrudes from the front face of the cursor switch body mounted on the board, a front decorative part, a hole that is fitted to the operating axle at the back face of the front decorative part, and a tubular part that is formed in a tubular

shape from the outer circumference of the front decorative part; a light emitting element mounted at the vicinity of the cursor switch body; a light guiding member that is provided at the front of the light emitting element and guides the light of the light emitting element to the front decorative part; and a panel composed of a light guiding tube that has a hole into which the cursor switch and the light emitting element are inserted and guides light toward the front decorative part and a light reflecting part that is inclined from the vicinity of the outer circumference at the base of the light guiding tube toward the vicinity of the lower end part of the tubular part, wherein the light reflecting part is formed so as to change the light route of the light that is reflected on the inner face of the operating knob and reaches the vicinity of the lower end face, and return it to the inside of the operating knob.

[WHAT IS CLAIMED IS;]

[Claim 1] An illumination structure of an operating knob, comprising;  
an operating knob having an operating axle of a cursor switch, a front decorative part and an outer circumferential part extending toward the back face of the front decorative part

from the outer circumference thereof, allowing the cursor switch to swing,

an illuminating means for illuminating said front decorative part from the inside,

a light guiding part into which said operating axle is inserted, for guiding the illumination of said illuminating means to said front decorative part, and

a light reflecting part, provided at the vicinity of the outer circumference of said light guiding part, for reflecting the illumination that is reflected on the inner face of said operating knob and reaches the vicinity of the end part of said outer circumferential part toward the inner face of the operating knob.

[Claim 2] The illumination structure of an operating knob according to Claim 1, wherein,

said light reflecting part is formed to be inclined toward the vicinity of the lower end part of the said outer circumferential part from the vicinity of the outer circumference of said light guiding part, so that the illumination that is reflected on the inner face of said operating knob and reaches the vicinity of the lower end face of said outer circumferential part returns toward the inner face of the operating knob.

[Claim 3] The illumination structure of an operating knob

according to Claim 1, wherein,  
said light reflecting part is provided so as to be inclined  
toward the vicinity of the lower end part of said outer  
circumferential part from the vicinity of the outer  
circumference at the base of said light guiding part.

[Claim 4] The illumination structure of an operating knob  
according to Claim 1, wherein,  
said light guiding part is formed in a staircase pattern toward  
the vicinity of the lower end part of said outer circumferential  
part from the vicinity of the outer circumference of said light  
guiding part.

[Claim 5] The illumination structure of an operating knob  
according to Claim 4, wherein,  
said light reflecting part is formed so that the staircase faces  
having a staircase pattern are inclined.

[Claim 6] An illumination structure of an operating knob,  
comprising;  
an operating knob having an operating axle of a cursor switch,  
a front decorative part and an outer circumferential part  
extending toward the back face of the front decorative part  
from the outer circumference thereof, allowing the cursor  
switch to swing,  
an illuminating means for illuminating said front decorative

part from the inside,

a light guiding part into which said operating axle is inserted, for guiding the illumination of said illuminating means to said front decorative part,

a light shielding part comprising a tubular part engaging with the inner diameter of the outer circumferential part of said operating knob, and a light shielding fin extending from the tubular part toward the center and reaching the vicinity of the tip end part of said light guiding part, and being formed so that the illumination that is reflected on the inner face of said operating knob and reaches the vicinity of the lower end face of the outer circumferential part returns toward the inner face of the operating knob.

[Claim 7] The illumination structure of the operating knob according to Claim 6, wherein said light shielding part is formed of non-translucent synthetic rubber or a resin member or the like.

[Claim 8] An illumination structure of an operating knob, comprising;

an operating knob having an operating axle of a cursor switch, a front decorative part and an outer circumferential part extending toward the back face of the front decorative part from the outer circumference thereof, allowing the cursor

switch to swing,  
an illuminating means for illuminating said front decorative part from the inside,  
a light guiding part into which said operating axle is inserted, for guiding the illumination of said illuminating means to said front decorative part,  
a light shielding part comprising a tubular part engaging with said light guiding part, and a light shielding fin extending toward the outside from the tubular part, elastically making contact with the inner face of the outer circumferential part of said operating knob, and being formed so that the illumination that is reflected on the inner face of said operating knob and reaches the vicinity of the lower end face of the outer circumferential part returns toward the inner face of the operating knob.

[Claim 9] The illumination structure of the operating knob according to Claim 8, wherein, said light shielding part is formed of highly flexible and non-translucent synthetic rubber or a resin member or the like.

[DETAILED DESCRIPTION OF THE INVENTION]

[0001].

[Field of the Invention] This invention relates to an illumination of an operating knob fitted into an operating axle

of a cursor switch, for moving the cursor displayed on a display device, in particular, to an illumination structure of the operating knob whose illumination light does not leak to the outside even when the cursor switch is operated, and which can illuminate more brightly and more uniformly.

[0002]

[Prior Art] An illumination structure of an operating knob of a conventional cursor switch is described with reference to Fig. 6.

[0003] Fig. 6 is a schematic structural cross sectional view showing an illumination structure of an operating knob of a conventional cursor switch.

[0004] 70 denotes an illumination structure of an operating knob fitted into an operating axle 73 of a cursor switch 71 for moving a cursor displayed on a display part of electronic equipment such as a navigation device mounted on a vehicle or the like.

[0005] The illumination structure 70 of the operating knob comprises the cursor switch 71, a light guiding part 75, a light emitting element 77, a printed board 78, an operating knob 78, panel 90 and the like.

[0006] The cursor switch 71 comprises a switch body 72 and the operating axle 73, is a switch for moving the cursor displayed

on a display part by being inclined in an inclination direction of the operating axle 73 (for example, predetermined 8 directions) and is mounted on a printed board. Furthermore, in the vicinity of the outer circumference of the switch body 72 (for example, predetermined 4 directions), a light emitting element 77 (LED) illuminating the operating knob 80 is mounted on the printed board 78.

[0007] A light guiding part 75 guides light from the light emitting element 77 mounted on a board 78 to the back face of the operating knob 80, illuminates a front decorative part 82 of the operating knob 80 and is provided on the front (upper in the figure) of the light emitting element 77. For a material of the light guiding part 75, silicon based and acrylic based resin members are used and formed by resin forming processing.

[0008] The operating knob 80 is of a tubular shape with a top plate, wherein the front decorative part 82 on which decorations 81 such as letters and symbols are formed is provided on the top plate, a crowning part 83 which is inserted into the operating handle 73 of the cursor switch 71 is protruded on the center of the back face of the front decorative part 82, and a press-fitting hole 84 which is inserted into the operating axle 73 is formed on the crowning part 83. A milky white translucent resin member or the like is used for a frame

part 85 of the operating knob 80, and the desired non-translucent resin member is used for an outer circumferential part 86 of the frame part 85, which are formed by two-color forming processing. Then, the front decorative part 82 is illuminated by the light from the back face. The operating knob 80 is formed not only by two-color forming, but, is formed in a manner such that the frame part 85 is resin-formed with the translucent resin member, and then, the outer circumferential part 86 of the frame part 85 is coated with the desired non-translucent paint, and the coating on the predetermined part is removed by laser machining, whereby the front decorative part 82 can be formed. Moreover, the entire knob can be illuminated by mono-color forming.

[0009] A cylinder part 91, which makes contact with the outer circumference of the light-guiding part 75 and extends toward the inner circumferential part of the tubular part (for example, cylinder) of the operating knob 80, is formed on the panel 90. A resin member is used as a material of the panel 90 and the panel 90 is formed by resin forming processing.

[0010]

[Problems to be Solved by the Invention] However, the illumination structure 70 of the above-described operating knob has a problem in that, when the cursor switch 71 is operated,

the light which illuminates the front decorative part 82 of the operating knob 80 is reflected on the inner face of the operating knob 80, the reflected light leaks from the gap between the lower end part of the operating knob 80 and the panel 90, and the leaked light is reflected on the panel 90 and leaks outside of the operating knob 80. This problem may be addressed by additionally providing light leaking preventive parts (not shown) as a countermeasure, however, this results in an increase in the number of structural parts, which raises the cost.

[0011] The object of this invention is to solve the above-described problem, and to provide an illumination structure of an operating knob at low cost which can reliably prevent leakage of illumination light on the front decorative part of the operating knob of the cursor switch.

[0012]

[Means for Solving the Problems] This invention is to achieve the above-described object, and is characterized by comprising an operating knob having an operating axle of a cursor switch, a front decorative part, and an outer circumference extending from the outer circumference of the front decorative part toward the back face of the front decorative part and which allows the cursor switch to swing; an illumination means for

illuminating said front decorative part from the inside; a light-guiding part, into which said operating axle is inserted, for guiding the illumination of said illumination means to said front decorative part; and a light reflecting part for reflecting the illumination which is reflected at the inner face of said operating knob toward the vicinity of the outer circumference of said light guiding part and reaches the vicinity of the end part of said outer circumferential part toward the inner face of the operating knob.

[0013] Furthermore, said light reflecting part is characterized by being inclined from the vicinity of the outer circumference of said light guiding part toward the vicinity of the lower end part of said outer circumferential part and is formed so that the illumination which is reflected in the inner face of said operating knob and reaches the vicinity of the lower end face of said outer circumferential part returns toward the inner face of the operating knob.

[0014] Furthermore, said light reflecting part is characterized by being provided so as to be inclined from the vicinity of the outer circumference of the base of said light guiding part toward the vicinity of the lower end part of said outer circumferential part.

[0015] Furthermore, said light reflecting part is

characterized by being formed in a staircase pattern from the vicinity of the outer circumference of said light guiding part toward the vicinity of the lower end part of said outer circumferential part.

[0016] Furthermore, said light reflecting part is characterized by being formed so that the staircase faces of said staircase pattern are inclined.

[0017] Furthermore, the invention is characterized by comprising an operating knob having an operating axle of a cursor switch, a front decorative part, and an outer circumferential part extending from the outer circumference of the front decorative part toward the back face of the front decorative part and which allows the cursor switch to swing; an illumination means for illuminating said front decorative part from the inside; a light guiding part, into which said operating axle is inserted, for guiding the illumination of said illumination means to said front decorative part; a light shielding part composed of a tubular part engaging with the inner diameter of the outer circumferential part of said operating knob and a light shielding fin extending from the tubular part toward the center and reaching the vicinity of the tip end part of said light guiding part, being formed such that the illumination which is reflected at the inner face of

said operating knob and reaches the vicinity of the lower end face of the outer circumferential part returns toward the inner face of the operating knob.

[0018] Furthermore, said light shielding part is characterized by being formed of non-translucent synthetic rubber or a resin member or the like.

[0019] Furthermore, the invention characterized by comprising an operating knob having an operating axle of a cursor switch, a front decorative part, and an outer circumferential part extending from the outer circumference of the front decorative part toward the back face of the front decorative part and which allows the cursor switch to swing; an illumination means for illuminating said front decorative part from the inside; a light guiding part, into which said operating axle is inserted, for guiding the illumination of said illumination means to said front decorative part; a shielding part composed of a tubular part engaging with said light guiding part and a light shielding fin extending from the tubular part toward the outside, resiliently making contact with the inner face of the outer circumferential part of said operating knob, being formed such that the illumination which is reflected at the inner face of said operating knob and reaches the vicinity of the lower end face of the outer circumferential part returns toward the inner

face of the operating knob.

[0020] Furthermore, said light shielding part is formed of highly flexible non-translucent synthetic rubber or a resin member or the like.

[0021]

[Preferred Embodiment] A first embodiment of the invention is described with reference to Fig. 1.

[0022] Fig. 1 is a schematic structural cross sectional view showing an illumination structure of an operating knob of a cursor switch according to the first embodiment of the invention.

[0023] 10 denotes an illumination structure of an operating knob fitted into an operating axle 22 of a cursor switch 20 displayed on a display part of electronic equipment, for example, a navigation device mounted on a vehicle or the like.

[0024] The illumination structure 10 of the operating knob comprises a cursor switch 20, a light guiding part 25, light emitting elements 27, a printed board 28, an operating knob 30, a panel 37 and the like.

[0025] The cursor switch 20 comprises a switch body 21 and an operating axle 22, and is a switch for moving a cursor displayed on a display part by being inclined in the inclination direction (for example, predetermined 8 directions) of the operating axle

22, and is used to be mounted on a printed board 28. In addition, in the vicinity (for example, predetermined 4 directions) of the outer circumference of the switch body 21, light emitting elements 27 (equivalent to the light emitting means of LED) are mounted on the printed board 28.

[0026] The light guiding part 25, which is provided on the front part (shown on the upper part of the Figure) of the light emitting elements 27, diffuses light from the light emitting elements 27 mounted on the board 28, guides the light to the back face of the operating knob 28, and illuminates the front decorative part 31 of the operating knob 30. For the material of the light guiding part 25, a silicon based or acrylic based resin member is used and formed by resin forming processing.

[0027] The operating knob 30 is of a tubular shape with a top plate, wherein a front decorative part 31, on which a decoration 36 such as letters and symbols is formed, is provided on the top plate, a crowning part 32 which is inserted into the operating knob 22 of the cursor switch 20 is protruded on the center of the back face of the front decorative part 31, and a press-fitting hole 33 which is inserted into the operating axle 22 is formed on the crowning part 32. A milky white translucent resin member or the like is used for the frame part 34 of the operating knob 30, and the desired non-translucent

resin member is used for the outer circumferential face 35 of the frame part 34, is formed by two-color forming processing. And, the front decorative part 31 is illuminated by light from the back face. Additionally, after the operating knob 30 is formed by two-color forming processing and the frame part 34 may be resin-formed of a translucent resin member, the outer circumferential face 35 of the frame part 34 may be coated with the desired non-translucent paint, and then the front decorative part 31 may be formed by removing the coating of the predetermined part by laser machining.

[0028] On the panel 37, formed is a cylinder part 38 (equivalent to the light guiding part) making contact with the outer circumference of the light guiding part 25 and extending toward the inner circumferential part of the tubular part (for example, cylinder) of the operating knob 30. And, formed is a light reflecting part 39 which is inclined from the outer circumference of the base of the cylinder part 38 toward the downward of the tubular part. In the light reflecting part 39, the light which is reflected on the inner face of the operating knob 30 and will leak to the outside from the lower end part of the operating knob 30, is reflected on the light reflecting part 39 and again returns to the inside of the operating knob 30 and then illuminates the front decorative part 31. A resin

member is used as a material of the panel 37 and the panel 37 is formed by resin forming processing.

[0029] As described above, in the illumination structure 10 of an operating knob for the cursor switch 20 according to a first embodiment of this invention, the light which is reflected on the inner face of the operating knob 30 is reflected on the light reflecting part 39 and again returns to the inside of the operating knob 30 by forming the light reflecting part 39 on the outer circumference of the base of the cylinder part 38 on the panel 37, whereby the illuminating light for the operating knob 30 does not leak to the outside of the operating knob 30 and can illuminate the front decorative part 31 of the operating knob 30 more brightly and uniformly even when the cursor switch 20 is operated. Therefore, illuminating quality can be enhanced and the cost can be reduced without increasing the number of parts for light shielding parts or the like.

[0030] Next, a second embodiment of this invention is described with reference to Fig. 2.

[0031] Fig. 2 is a schematic structural cross sectional view showing an illumination structure of the operating knob for the cursor switch according to the second embodiment of this invention. In the second embodiment, the first embodiment is

partially modified, while others are substantially the same as those of the first embodiment, therefore, the same symbols are attached to the same structures and the description thereof is omitted.

[0032] The illumination structure 11 of the operating knob comprises a cursor switch 20, a light guiding part 25, light emitting elements 27, a printed board 28, an operating knob 30, a panel 40 and the like.

[0033] On the panel 40, formed is a cylinder part 41 (equivalent to the light guiding part) making contact with the outer circumference of the light guiding part 25 and extending toward the inner circumferential part of the tubular part (for example, a cylinder) of the operating knob 30. And, formed is a light reflecting part 42 having a staircase pattern descending from the substantial center of the outer circumference of the cylinder part 41 toward the downward of the operating knob 30. In the light reflecting part 42, the light which is reflected on the inner face of the operating knob 30 and will leak to the outside from the lower end part of the operating knob 30, is reflected on the light reflecting part 42 and again returns to the inside of the operating knob 30 and then illuminates the front decorative part 31.

[0034] Moreover, the light reflecting part 42 having a

staircase pattern may be formed in a staircase pattern descending from downward of the tubular part of the operating knob 30 toward the outer circumference of the base of the cylinder part 41 on the panel 40 (not shown). A resin member is used as a material of the panel 40 and the panel 40 is formed by resin forming processing.

[0035] As described above, also in the illumination structure 11 of an operating knob for the cursor switch 20 according to the second embodiment of this invention, same as in the first embodiment, the light reflecting part 42 having a staircase pattern is provided on the outer circumference of the cylinder part 41 on the panel 40, therefore, the light which is reflected on the inner face of the operating knob 30 is reflected on the respective light reflecting part 42 having a staircase pattern and again returns to the inside of the operating knob 30, thereby the illuminating light for the operating knob 30 does not leak to the outside of the operating knob 30 and can illuminate the front decorative part 31 of the operating knob 30 more brightly and uniformly even when the cursor switch 20 is operated. Therefore, illuminating quality can be enhanced and the cost can be reduced without increasing the number of parts for light shielding parts or the like.

[0036] Next, a third embodiment of this invention is described

with reference to Fig. 3.

[0037] Fig. 3 is a schematic structural cross sectional view showing an illumination structure of the operating knob for the cursor switch according to the third embodiment of this invention. In the third embodiment, the first embodiment is partially modified, while others are substantially the same as those of the first and second embodiments, therefore, the same symbols are attached to the same structures and the description thereof is omitted.

[0038] The illumination structure 12 of the operating knob comprises a cursor switch 20, a light guiding part 25, light emitting elements 27, a printed board 28, an operating knob 30, a panel 45 and the like.

[0039] On the panel 45, formed is a cylinder part 46 (equivalent to the light guiding part) making contact with the outer circumference of the light guiding part 25 and extending toward the inner circumferential part of the tubular part (for example, a cylinder) of the operating knob 30. And, formed is a light reflecting part 47 having a staircase pattern descending from the substantial center of the outer circumference of the cylinder part 46 toward the downward of the tubular part of the operating knob 30, and a gradient is provided so that the upper face of the light guiding part 47 descends toward the

center of the cylinder part 46. In the light reflecting part 47, the light which is reflected on the inner face of the operating knob 30 and will leak to the outside from the lower end part of the operating knob 30, is reflected on the light reflecting part 47 and again returns to the inside of the operating knob 30 and then illuminates the front decorative part 31.

[0040] Moreover, even if the light reflecting part 47 having a staircase pattern is formed in a staircase pattern descending from the downward of the tubular part of the operating knob 30 toward the outer circumference of the base of the cylinder part 46 on the panel 45 (not shown), almost the same effect can be obtained as that shown in Fig. 2. A resin member is used as a material of the panel 45 and the panel 45 is formed by resin forming processing.

[0041] As described above, also in the illumination structure 12 of an operating knob for the cursor switch 20 according to the third embodiment of this invention, same as in the second embodiment, the light reflecting part 47 having a staircase pattern and having a gradient so as to descend toward the center of the cylinder, is provided on the outer circumference of the cylinder part 46 on the panel 40, therefore, the light which is reflected on the inner face of the operating knob 30 and

will leak to the outside from the lower end part of the operating knob 30, is reflected on the respective light reflecting part 47 having a staircase pattern and again returns to the inside of the operating knob 30, thereby the illuminating light for the operating knob 30 does not leak to the outside of the operating knob 30 and can illuminate the front decorative part 31 of the operating knob 30 more brightly and uniformly even when the cursor switch 20 is operated. Therefore, illuminating quality can be enhanced and the cost can be reduced without increasing the number of parts for light shielding parts or the like.

[0042] Then, a fourth embodiment of this invention is described with reference to Fig. 4.

[0043] Fig. 4 is a schematic structural cross sectional view showing an illumination structure of the operating knob for the cursor switch according to the fourth embodiment of this invention. In the fourth embodiment, the first embodiment is partially modified, while others are substantially the same as those of the first embodiment, therefore, the same symbols are attached to the same structures and the description thereof is omitted.

[0044] The illumination structure 13 of the operating knob comprises a cursor switch 20, a light guiding part 25, light

emitting elements 27, a printed board 28, an operating knob 30, a panel 50, a light shielding part 55 and the like.

[0045] On the panel 50, formed is a cylinder part 51 (equivalent to the light guiding part) making contact with the outer circumference of the light guiding part 25 and extending toward the inner circumferential part of the tubular part (for example, cylinder) of the operating knob 30. A resin member is used as a material of the panel 50 and the panel 50 is formed by resin forming processing.

[0046] On the light shielding part 55, formed are a cylinder part 56 engaging with the inner diameter of the tubular part of the operating knob 30, and a light shielding fin 57 protruding toward the center of the cylinder part 56 from the lower end part thereof. A non-translucent (for example, black) synthetic rubber member or a resin member is used as a material of the light shielding part 55, which is formed by forming processing.

[0047] As described above, even in the illumination structure 13 of an operating knob for the cursor switch 20 according to the fourth embodiment of this invention, by disposing the light shielding part 55 on the inner side face of the operating knob 30, the light which is reflected on the inner face of the operating knob 30 and will leak to the outside from the lower

end part of the operating knob 30, is reliably shielded by the light shielding fin 57 on the light shielding part 55 and the cylinder part 51 on the panel 50. Therefore, the illuminating light for the operating knob 30 does not leak to the outside of the operating knob 30 and can illuminate the operating knob 30 more brightly and uniformly even when the cursor switch 20 is operated, thereby, the illuminating quality of the front decorative part 31 of the operating knob 30 can be enhanced. In addition, the metal mold cost can also be reduced and cost effectiveness can be obtained.

[0048] The illuminating quality of the front decorative part 31 of the operating knob 30 can be further enhanced by using the light shielding part 55 according to the fourth embodiment of this invention together with the first, second and third embodiments.

[0049] Next, a fifth embodiment of this invention is described with reference to Fig. 5.

[0050] Fig. 5 is a schematic structural cross sectional view showing an illumination structure of the operating knob for the cursor switch according to the fifth embodiment of this invention. In the fifth embodiment, the first embodiment is partially modified, while others are substantially the same as those of the first embodiment, therefore, the same symbols

are attached to the same structures and the description thereof is omitted.

[0051] The illumination structure 14 of the operating knob comprises a cursor switch 20, a light guiding part 25, light emitting elements 27, a printed board 28, an operating knob 30, a panel 60, a light shielding part 65 and the like.

[0052] On the panel 60, formed is a cylinder part 61 (equivalent to the light guiding part) making contact with the outer circumference of the light guiding part 25 and extending toward the inner circumferential part of the tubular part (for example, cylinder) of the operating knob 30. A resin member is used as a material of the panel 60, which is formed by resin forming processing.

[0053] On the light shielding part 65, formed are a cylinder part 66 engaging with the outer diameter of the cylinder part 61 on the panel 60, and a light shielding fin 67 extending toward the inner circumference of the tubular part of the operating knob 30 from the upper end part of the cylinder part 66. The outer diameter of the light shielding fin 67 is formed to be larger than the inner diameter of the tubular part of the operating knob 30 (in a sagging state during engagement and to the extent where a gap is not formed even when the cursor switch 20 is operated). A highly flexible and non-translucent

(for example, black) synthetic rubber member or a resin member is used as a material of the light shielding part 65, which is formed by forming processing.

[0054] As described above, in the illumination structure 14 of an operating knob for the cursor switch 20 according to the fourth embodiment of this invention, the outer circumference of the light shielding fin 67 of the light shielding part 65 fixed to the cylinder part 61 on the panel 60 is disposed on the inner side face of operating knob 30 in a sagging state, and this brings about close contact, therefore, no gap is formed between the inner side face of the operating knob 30 and the outer circumference of the light shielding fin 67, whereby the illuminating light is completely prevented from leaking to the outside of the operating knob 30. Accordingly, the front decorative part 31 of the operating knob 30 can be illuminated more brightly and uniformly, therefore, the illuminating quality can be enhanced. In addition, the metal mold cost can also be reduced and cost effectiveness can be obtained because the shapes of components are simplified.

[0055] In this embodiment, the center of the light shielding fin 67 of the light shielding part 65 sags toward the front decorative part 31, however, the same effect can be obtained even in a case where sagging is made inversely. The same effect

can be obtained with some conditions merely by elastic contact, not by sagging.

[0056]

[Effect of the Invention] As described above, this invention can provide an illumination structure of an operating knob at low cost that can reliably prevent leakage of illumination light at the front decorative part of an operating knob of a cursor switch.

[BRIEF DESCRIPTION OF DRAWINGS]

[Fig. 1] is a schematic structural cross sectional view showing an illumination structure of an operating knob of a cursor switch according to the first embodiment of this invention.

[Fig. 2] is a schematic structural cross sectional view showing an illumination structure of an operating knob of a cursor switch according to the second embodiment of this invention.

[Fig. 3] is a schematic structural cross sectional view showing an illumination structure of an operating knob of a cursor switch according to the third embodiment of this invention.

[Fig. 4] is a schematic structural cross sectional view showing an illumination structure of an operating knob of a cursor switch according to the fourth embodiment of this invention.

[Fig. 5] is a schematic structural cross sectional view showing an illumination structure of an operating knob of a cursor

switch according to the fifth embodiment of this invention.

[Fig. 6] is a schematic structural cross sectional view showing an illumination structure of an operating knob of a conventional cursor switch.

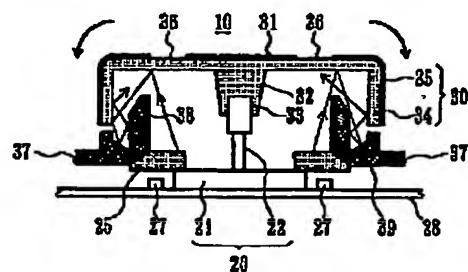
[Description of Symbols]

- 10, 11, 12, 13, 14 Illumination structure of operating knob
- 20 Cursor switch
- 21 Switch body
- 22 Operating axle
- 25 Light guiding part
- 27 Light emitting elements
- 28 Printed board
- 30 Operating knob
- 31 Front decorative part
- 32 Crowning part
- 33 Press fitting hole
- 34 Frame part
- 35 Outer circumferential face
- 36 Decoration
- 37, 40, 45, 50, 60 Panel
- 38, 41, 46, 51, 56, 61, 66 Cylinder part
- 39, 42, 47 Light reflecting part
- 55, 65 Light shielding part

57, 67 Light shielding fin

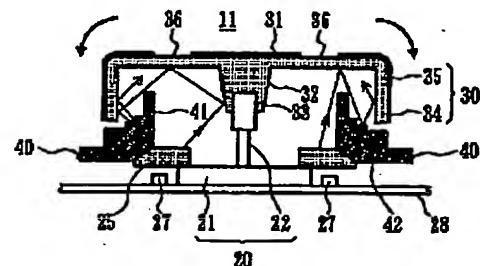
# Fig.1

Schematic structural cross sectional view showing an illumination structure of an operating knob of a cursor switch according to the first embodiment of this invention



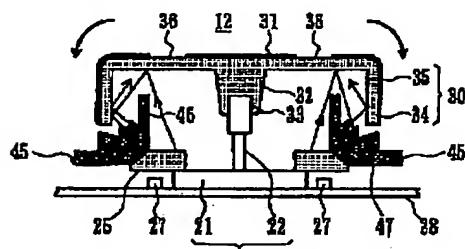
# Fig.2

Schematic structural cross sectional view showing an illumination structure of an operating knob of a cursor switch according to the second embodiment of this invention



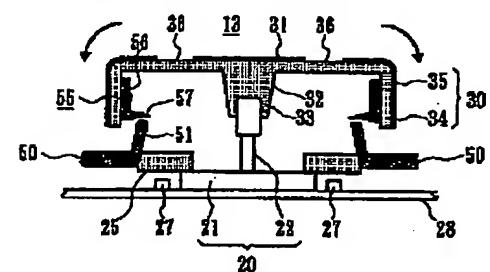
# Fig.3

Schematic structural cross sectional view showing an illumination structure of an operating knob of a cursor switch according to the third embodiment of this invention



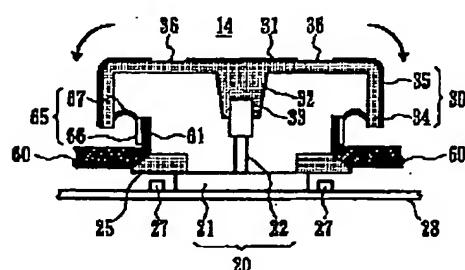
# Fig.4

Schematic structural cross sectional view showing an illumination structure of an operating knob of a cursor switch according to the fourth embodiment of this invention



# Fig.5

Schematic structural cross sectional view showing an illumination structure of an operating knob of a cursor switch according to the fifth embodiment of this invention



# Fig.6

Schematic structural cross sectional view showing an illumination structure of an operating knob of a conventional cursor switch.

